

Supplemental Dataset S1

WT-cow	AGCTAATCTC	CAGGCCTAGG	AAGCACTTTC	CACCTCCTGG	CTGAATTCCA
Trans-cow	AGCTAATCTC	CAGGCCTAGG	AAGCACTTTC	CACCTCCTGG	CTGAATTCCA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	AGGAGACATT	CTTGTTCTGT	GACCCTGCAG	CTTGTTTCCT	TCTCTGGGCC
Trans-cow	AGGAGACATT	CTTGTTCTGT	GACCCTGCAG	CTTGTTTCCT	TCTCTGGGCC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	AAGGTGGAAG	CTGACGAGGA	GAGAAAAGGG	GCGCCTGGCC	ACGTAGGGGG
Trans-cow	AAGGTGGAAG	CTGACGAGGA	GAGAAAAGGG	GCGCCTGGCC	ACGTAGGGGG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	AGGGAAGCCC	AGAGGCTCTG	CAGCTGCCGC	CTGCTGCAGA	GTTCTTGTCC
Trans-cow	AGGGAAGCCC	AGAGGCTCTG	CAGCTGCCGC	CTGCTGCAGA	GTTCTTGTCC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

**Probe 1-primer-1F**



WT-cow	CTGGTCACCA	<b>ACCAGTTCTT</b>	<b>TGATGGGTGT</b>	CATGGAACCC	CCAGCGCTGA
Trans-cow	CTGGTCACCA	<b>ACCAGTTCTT</b>	<b>TGATGGGTGT</b>	CATGGAACCC	CCAGCGCTGA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	GCACCAGAGG	CTGGCCTGGT	AAGCTTGTGT	CCAACCTCCA	AGAGGGCCTG
Trans-cow	GCACCAGAGG	CTGGCCTGGT	AAGCTTGTGT	CCAACCTCCA	AGAGGGCCTG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	TCTCTTGCTC	TTATGGGCTC	TAGAACCTAA	GTTTAACCCA	GCTCTGTGAG
Trans-cow	TCTCTTGCTC	TTATGGGCTC	TAGAACCTAA	GTTTAACCCA	GCTCTGTGAG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CCTCGCTCAG	ACCCTGCTCA	CCTCAATCTC	CCCACCTATA	CACATGGACC
Trans-cow	CCTCGCTCAG	ACCCTGCTCA	CCTCAATCTC	CCCACCTATA	CACATGGACC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	TGAATTCAAG	GCCCAGCACA	TTCCTCCCAA	GGGGTAAGGG	CACACAGTCC
Trans-cow	TGAATTCAAG	GCCCAGCACA	TTCCTCCCAA	GGGGTAAGGG	CACACAGTCC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CCTCTGAGCT	GTGCTAAGAG	GGCTCCCCCA	AGCCCACGCC	CATCCCAACT
Trans-cow	CCTCTGAGCT	GTGCTAAGAG	GGCTCCCCCA	AGCCCACGCC	CATCCCAACT
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

**5' Junction primer-F**

WT-cow	CTGCTTGCCC	AGTTGGGGTT	TTGCCCAGTT	GTGCCCTCCG	TGTA	CTCTGC
Trans-cow	CTGCTTGCCC	AGTTGGGGTT	TTGCCCAGTT	GTGCCCTCCG	TGTA	CTCTGC
pDonor-1	-----	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----	-----

WT-cow	TGAGAGCTGA	CCAGAGCAGA	AATGCTATTG	AGCCCAGACC	TCCGTA	CTGA
Trans-cow	TGAGAGCTGA	CCAGAGCAGA	AATGCTATTG	AGCCCAGACC	TCCGTA	CTGA
pDonor-1	-----	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----	-----

WT-cow	CGTTTCTATG	GACTCCAAAG	GGCCCAGCCT	CATCAAATGT	TTGCAGTTCT
Trans-cow	CGTTTCTATG	GACTCCAAAG	GGCCCAGCCT	CATCAAATGT	TTGCAGTTCT
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

**Probe 1-primer-1R**

WT-cow	CCCAACATAC	CCTTCTGTCA	AGCCCTCTCT	AAATTGGCTC	CTTTGTGAAC
Trans-cow	CCCAACATAC	CCTTCTGTCA	AGCCCTCTCT	AAATTGGCTC	CTTTGTGAAC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	TCCTATTCAC	ATGTCAAAGC	CCAGCCCCCA	AAACCCCATC	CTATAGGAAG
Trans-cow	TCCTATTCAC	ATGTCAAAGC	CCAGCCCCCA	AAACCCCATC	CTATAGGAAG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CCTTGCTTGA	TCCTCGGACT	GGGTTGCCCC	TCCTGCAGTT	CAGCACCTCA
Trans-cow	CCTTGCTTGA	TCCTCGGACT	GGGTTGCCCC	TCCTGCAGTT	CAGCACCTCA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	TGTGTTTCAGG	ATATCAGACA	GTTGTTTTCC	CCAGGGACCC	CTGGAGAACA
Trans-cow	TGTGTTTCAGG	ATATCAGACA	GTTGTTTTCC	CCAGGGACCC	CTGGAGAACA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

**Not I**

**Left homology arm (777bp)**

WT-cow	GGGTTCAAGT	CTGACCCGTG	AGTGTTATCA	GACACCAGGT	GAGTCAGCTG
Trans-cow	GGGTTCAAGT	CTGACCCGTG	AGTGTTATCA	GACACCAGGT	GAGTCAGCTG
pDonor-1	GCGGCCGCGT	CTGACCCGTG	AGTGTTATCA	GACACCAGGT	GAGTCAGCTG
pDonor-2	GCGGCCGCGT	CTGACCCGTG	AGTGTTATCA	GACACCAGGT	GAGTCAGCTG

WT-cow	CAGTCCAGAG	ACCCGAAGAC	TTGCTGTGAC	ACCTTCCCTC	CTATACTCCC
Trans-cow	CAGTCCAGAG	ACCCGAAGAC	TTGCTGTGAC	ACCTTCCCTC	CTATACTCCC
pDonor-1	CAGTCCAGAG	ACCCGAAGAC	TTGCTGTGAC	ACCTTCCCTC	CTATACTCCC
pDonor-2	CAGTCCAGAG	ACCCGAAGAC	TTGCTGTGAC	ACCTTCCCTC	CTATACTCCC

WT-cow	CGTCAACATC	CGCTGGAAGG	TGTGAGCCCT	GAGCTGGCCC	AACCCCTTCC
Trans-cow	CGTCAACATC	CGCTGGAAGG	TGTGAGCCCT	GAGCTGGCCC	AACCCCTTCC
pDonor-1	CGTCAACATC	CGCTGGAAGG	TGTGAGCCCT	GAGCTGGCCC	AACCCCTTCC
pDonor-2	CGTCAACATC	CGCTGGAAGG	TGTGAGCCCT	GAGCTGGCCC	AACCCCTTCC

WT-cow	TCCCCAGGCC	TATTCCTCAT	CAGCTTTGGC	AGTCCTAGGA	CATTATCCCT
Trans-cow	TCCCCAGGCC	TATTCCTCAT	CAGCTTTGGC	AGTCCTAGGA	CATTATCCCT
pDonor-1	TCCCCAGGCC	TATTCCTCAT	CAGCTTTGGC	AGTCCTAGGA	CATTATCCCT
pDonor-2	TCCCCAGGCC	TATTCCTCAT	CAGCTTTGGC	AGTCCTAGGA	CATTATCCCT

**Left homology arm (777bp)**

WT-cow	GCCAGGGCTG	TGCCACACACC	CTCCTGGGAC	AGGGTGCTCA	CACCTTGGAG
Trans-cow	GCCAGGGCTG	TGCCACACACC	CTCCTGGGAC	AGGGTGCTCA	CACCTTGGAG
pDonor-1	GCCAGGGCTG	TGCCACACACC	CTCCTGGGAC	AGGGTGCTCA	CACCTTGGAG
pDonor-2	GCCAGGGCTG	TGCCACACACC	CTCCTGGGAC	AGGGTGCTCA	CACCTTGGAG

**Surveyor-detect-primer -F**

WT-cow	AGACAGCACA	TC <b>GACTCCTG</b>	<b>TAACCTCTGT</b>	<b>CCCTG</b> CTGTA	GAGAACTGGA
Trans-cow	AGACAGCACA	TC <b>GACTCCTG</b>	<b>TAACCTCTGT</b>	<b>CCCTG</b> CTGTA	GAGAACTGGA
pDonor-1	AGACAGCACA	TC <b>GACTCCTG</b>	<b>TAACCTCTGT</b>	<b>CCCTG</b> CTGTA	GAGAACTGGA
pDonor-2	AGACAGCACA	TC <b>GACTCCTG</b>	<b>TAACCTCTGT</b>	<b>CCCTG</b> CTGTA	GAGAACTGGA

WT-cow	TCCATTCATC	TTCCCCTCCC	TTCCCTCTCCT	CCTTCCTTCC	TTCCTTCTAT
Trans-cow	TCCATTCATC	TTCCCCTCCC	TTCCCTCTCCT	CCTTCCTTCC	TTCCTTCTAT
pDonor-1	TCCATTCATC	TTCCCCTCCC	TTCCCTCTCCT	CCTTCCTTCC	TTCCTTCTAT
pDonor-2	TCCATTCATC	TTCCCCTCCC	TTCCCTCTCCT	CCTTCCTTCC	TTCCTTCTAT

WT-cow	CTGAAGACAG	AAGCTCAAAA	CTGCACTTAC	TTACATCCTG	AGAGGGGGAC
Trans-cow	CTGAAGACAG	AAGCTCAAAA	CTGCACTTAC	TTACATCCTG	AGAGGGGGAC
pDonor-1	CTGAAGACAG	AAGCTCAAAA	CTGCACTTAC	TTACATCCTG	AGAGGGGGAC
pDonor-2	CTGAAGACAG	AAGCTCAAAA	CTGCACTTAC	TTACATCCTG	AGAGGGGGAC

WT-cow	CCCACAGTGA	TCAAAACAGA	CATGGTCCCT	GCCAGTGGAG	CATGGAGGAA
Trans-cow	CCCACAGTGA	TCAAAACAGA	CATGGTCCCT	GCCAGTGGAG	CATGGAGGAA
pDonor-1	CCCACAGTGA	TCAAAACAGA	CATGGTCCCT	GCCAGTGGAG	CATGGAGGAA
pDonor-2	CCCACAGTGA	TCAAAACAGA	CATGGTCCCT	GCCAGTGGAG	CATGGAGGAA

WT-cow	GAGAGCATGA	TCACACACTT	ACATCCAATA	ACTGGCTGTG	ATGAGCATGA
Trans-cow	GAGAGCATGA	TCACACACTT	ACATCCAATA	ACTGGCTGTG	ATGAGCATGA
pDonor-1	GAGAGCATGA	TCACACACTT	ACATCCAATA	ACTGGCTGTG	ATGAGCATGA
pDonor-2	GAGAGCATGA	TCACACACTT	ACATCCAATA	ACTGGCTGTG	ATGAGCATGA

WT-cow	GGAAGAAGTG	TAGGAGCCAC	AAGAACCTTG	CCCTTGTCCA	GGAATCCAGG
Trans-cow	GGAAGAAGTG	TAGGAGCCAC	AAGAACCTTG	CCCTTGTCCA	GGAATCCAGG
pDonor-1	GGAAGAAGTG	TAGGAGCCAC	AAGAACCTTG	CCCTTGTCCA	GGAATCCAGG
pDonor-2	GGAAGAAGTG	TAGGAGCCAC	AAGAACCTTG	CCCTTGTCCA	GGAATCCAGG

WT-cow	GGGGCTTCCT	GGAAGAGGTG	ATATGTACAC	CAAACCCTAA	AGGAGAAGCA
Trans-cow	GGGGCTTCCT	GGAAGAGGTG	ATATGTACAC	CAAACCCTAA	AGGAGAAGCA
pDonor-1	GGGGCTTCCT	GGAAGAGGTG	ATATGTACAC	CAAACCCTAA	AGGAGAAGCA
pDonor-2	GGGGCTTCCT	GGAAGAGGTG	ATATGTACAC	CAAACCCTAA	AGGAGAAGCA

WT-cow	GAACTTAAAG	AAGCAGAAAG	GATGCGTGTG	GGGAGCAGAG	TCCATTACAG
Trans-cow	GAACTTAAAG	AAGCAGAAAG	GATGCGTGTG	GGGAGCAGAG	TCCATTACAG
pDonor-1	GAACTTAAAG	AAGCAGAAAG	GATGCGTGTG	GGGAGCAGAG	TCCATTACAG
pDonor-2	GAACTTAAAG	AAGCAGAAAG	GATGCGTGTG	GGGAGCAGAG	TCCATTACAG

WT-cow	ACCGAGAGAA	CAGGAAGGGC	AGAGGCCCTG	AGGCAGATTT	GGTGTTCCTAA
Trans-cow	ACCGAGAGAA	CAGGAAGGGC	AGAGGCCCTG	AGGCAGATTT	GGTGTTCCTAA
pDonor-1	ACCGAGAGAA	CAGGAAGGGC	AGAGGCCCTG	AGGCAGATTT	GGTGTTCCTAA
pDonor-2	ACCGAGAGAA	CAGGAAGGGC	AGAGGCCCTG	AGGCAGATTT	GGTGTTCCTAA

**Left homology arm (777bp)**

WT-cow	GGATTAGAAG	GCAGAGTGTC	TGGGAACACA	GAGTAAGGCT	GGAGGGGCAA
Trans-cow	GGATTAGAAG	GCAGAGTGTC	TGGGAACACA	GAGTAAGGCT	GGAGGGGCAA
pDonor-1	GGATTAGAAG	GCAGAGTGTC	TGGGAACACA	GAGTAAGGCT	GGAGGGGCAA
pDonor-2	GGATTAGAAG	GCAGAGTGTC	TGGGAACACA	GAGTAAGGCT	GGAGGGGCAA

WT-cow	GGGGGTGAGG	TTAGCCACAC	TCCCAAACCTA	GCCGCGGTCT	CCACAAC---
Trans-cow	GGGGGTGAGG	TTAGCCACAC	TCCCAAACCTA	GCCGCGTCGA	CCATCACAGC
pDonor-1	GGGGGTGAGG	TTAGCCACAC	TCCCAAACCTA	GCCGCGTCGA	CCATCACAGC
pDonor-2	GGGGGTGAGG	TTAGCCACAC	TCCCAAACCTA	GCCGCGTCGA	CCATCACAGC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTCCTACCCC	AGCCCTATCC	CCCAGCCACC	CCACGTGAGT	CCAAAGTAGT
pDonor-1	CTCCTACCCC	AGCCCTATCC	CCCAGCCACC	CCACGTGAGT	CCAAAGTAGT
pDonor-2	CTCCTACCCC	AGCCCTATCC	CCCAGCCACC	CCACGTGAGT	CCAAAGTAGT

**NRAMP1 promoter (1742bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GATTGCAAAC	CTGTGTAAAC	CCTAGAGGTC	AAGGCTGGTG	ACTTGAGCAA
pDonor-1	GATTGCAAAC	CTGTGTAAAC	CCTAGAGGTC	AAGGCTGGTG	ACTTGAGCAA
pDonor-2	GATTGCAAAC	CTGTGTAAAC	CCTAGAGGTC	AAGGCTGGTG	ACTTGAGCAA

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGGGATTGCA	CATGGACAAA	CCACAGTGCT	GCTCTGTCAT	TCGTGACTCA
pDonor-1	CGGGATTGCA	CATGGACAAA	CCACAGTGCT	GCTCTGTCAT	TCGTGACTCA
pDonor-2	CGGGATTGCA	CATGGACAAA	CCACAGTGCT	GCTCTGTCAT	TCGTGACTCA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACCATTCACC	CCTCTACCCC	TGCCTCTCCC	GTCCCTCCAG	CCTCTCTTTT
pDonor-1	ACCATTCACC	CCTCTACCCC	TGCCTCTCCC	GTCCCTCCAG	CCTCTCTTTT
pDonor-2	ACCATTCACC	CCTCTACCCC	TGCCTCTCCC	GTCCCTCCAG	CCTCTCTTTT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CAACGAGGAG	CCAGGAAATT	GGCTGCCTCC	CCCCATCCTG	GGGTTCGAAG
pDonor-1	CAACGAGGAG	CCAGGAAATT	GGCTGCCTCC	CCCCATCCTG	GGGTTCGAAG
pDonor-2	CAACGAGGAG	CCAGGAAATT	GGCTGCCTCC	CCCCATCCTG	GGGTTCGAAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTTTGGCTCA	AGTTTTTGAC	TCAACCTGAG	GAAACATCAC	ATCCCAGATC
pDonor-1	CTTTGGCTCA	AGTTTTTGAC	TCAACCTGAG	GAAACATCAC	ATCCCAGATC
pDonor-2	CTTTGGCTCA	AGTTTTTGAC	TCAACCTGAG	GAAACATCAC	ATCCCAGATC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AAGCCTGGGC	TTGGGAACAA	GCCCTGATTT	TCTCTGTGTC	TGGAGGTCCA
pDonor-1	AAGCCTGGGC	TTGGGAACAA	GCCCTGATTT	TCTCTGTGTC	TGGAGGTCCA
pDonor-2	AAGCCTGGGC	TTGGGAACAA	GCCCTGATTT	TCTCTGTGTC	TGGAGGTCCA

**NRAMP1 promoter (1742bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GACTTTGGAG	TTGGAAACAC	CATGACAATT	CGAGTTTTAA	ATCTTCTTGG
pDonor-1	GACTTTGGAG	TTGGAAACAC	CATGACAATT	CGAGTTTTAA	ATCTTCTTGG
pDonor-2	GACTTTGGAG	TTGGAAACAC	CATGACAATT	CGAGTTTTAA	ATCTTCTTGG

**5' Junction primer-R**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CAGAAAAGAA	AGGATACAGG	ATAGAGGACA	TGAGTGGGCA	TGGCAGGGAG
pDonor-1	CAGAAAAGAA	AGGATACAGG	ATAGAGGACA	TGAGTGGGCA	TGGCAGGGAG
pDonor-2	CAGAAAAGAA	AGGATACAGG	ATAGAGGACA	TGAGTGGGCA	TGGCAGGGAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AAGACTCTGA	GGGAGGTAAG	TGGGGGGATA	AAGGAGTTGG	CAGCTGGCAA
pDonor-1	AAGACTCTGA	GGGAGGTAAG	TGGGGGGATA	AAGGAGTTGG	CAGCTGGCAA
pDonor-2	AAGACTCTGA	GGGAGGTAAG	TGGGGGGATA	AAGGAGTTGG	CAGCTGGCAA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGAGAAGAGA	TTGGGAGCTG	GAAGGGTCTA	GAGCTAACAG	ATTGATCATC
pDonor-1	GGAGAAGAGA	TTGGGAGCTG	GAAGGGTCTA	GAGCTAACAG	ATTGATCATC
pDonor-2	GGAGAAGAGA	TTGGGAGCTG	GAAGGGTCTA	GAGCTAACAG	ATTGATCATC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTAAAGTGGG	ATCTGGCCCA	TAGAAAACGCT	TGCTTAGGTC	ACCCAATATT
pDonor-1	CTAAAGTGGG	ATCTGGCCCA	TAGAAAACGCT	TGCTTAGGTC	ACCCAATATT
pDonor-2	CTAAAGTGGG	ATCTGGCCCA	TAGAAAACGCT	TGCTTAGGTC	ACCCAATATT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGCAAAACAT	TTGAGCCCAG	TATTCAAACA	GCATATGTTG	CATAAATTTT
pDonor-1	TGCAAAACAT	TTGAGCCCAG	TATTCAAACA	GCATATGTTG	CATAAATTTT
pDonor-2	TGCAAAACAT	TTGAGCCCAG	TATTCAAACA	GCATATGTTG	CATAAATTTT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCAGCATCCT	TGACAAAACA	GACGACTTAG	TGACAGTGGA	CCCACATCCT
pDonor-1	CCAGCATCCT	TGACAAAACA	GACGACTTAG	TGACAGTGGA	CCCACATCCT
pDonor-2	CCAGCATCCT	TGACAAAACA	GACGACTTAG	TGACAGTGGA	CCCACATCCT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CACATGACAA	CTGGCTGGAA	CTCTGTGAGC	ACTGCCCTCT	TCAGACAGAG
pDonor-1	CACATGACAA	CTGGCTGGAA	CTCTGTGAGC	ACTGCCCTCT	TCAGACAGAG
pDonor-2	CACATGACAA	CTGGCTGGAA	CTCTGTGAGC	ACTGCCCTCT	TCAGACAGAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TTTATGACCT	TTGTCTCCAT	CATTCCCTCC	CTCCCTCCCT	CATAGCTCCA
pDonor-1	TTTATGACCT	TTGTCTCCAT	CATTCCCTCC	CTCCCTCCCT	CATAGCTCCA
pDonor-2	TTTATGACCT	TTGTCTCCAT	CATTCCCTCC	CTCCCTCCCT	CATAGCTCCA

***NRAMP1* promoter (1742bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCGGTAAAGA	ATCTGCCTGC	AATGCAGGAG	ACCTGGGTTC	GATTTCTGGG
pDonor-1	TCGGTAAAGA	ATCTGCCTGC	AATGCAGGAG	ACCTGGGTTC	GATTTCTGGG
pDonor-2	TCGGTAAAGA	ATCTGCCTGC	AATGCAGGAG	ACCTGGGTTC	GATTTCTGGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TTGGGAAGAT	CCCCTGGAGA	AGGAAATGGC	AACCCACTCC	AGTATTCTTG
pDonor-1	TTGGGAAGAT	CCCCTGGAGA	AGGAAATGGC	AACCCACTCC	AGTATTCTTG
pDonor-2	TTGGGAAGAT	CCCCTGGAGA	AGGAAATGGC	AACCCACTCC	AGTATTCTTG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCTGGAAAAT	CCCATGGACA	GAGGAGCCTG	GCGGGCTACG	TCCATGAGGT
pDonor-1	CCTGGAAAAT	CCCATGGACA	GAGGAGCCTG	GCGGGCTACG	TCCATGAGGT
pDonor-2	CCTGGAAAAT	CCCATGGACA	GAGGAGCCTG	GCGGGCTACG	TCCATGAGGT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGCAAGTGTT	GGACACGACT	TAGTGACTAA	ACCACCACCA	CTCCCTATTA
pDonor-1	CGCAAGTGTT	GGACACGACT	TAGTGACTAA	ACCACCACCA	CTCCCTATTA
pDonor-2	CGCAAGTGTT	GGACACGACT	TAGTGACTAA	ACCACCACCA	CTCCCTATTA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTTCCCCCTG	ATACTGAGGC	TGAGCATCGT	TTGTCATTGA	GCACTGAGCC
pDonor-1	CTTCCCCCTG	ATACTGAGGC	TGAGCATCGT	TTGTCATTGA	GCACTGAGCC
pDonor-2	CTTCCCCCTG	ATACTGAGGC	TGAGCATCGT	TTGTCATTGA	GCACTGAGCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGCACTG TTC TTCTCATTCC CAACCTGTCT CATAGTTTAT CTTACCTGCC				
pDonor-1	AGCACTG TTC TTCTCATTCC CAACCTGTCT CATAGTTTAT CTTACCTGCC				
pDonor-2	AGCACTG TTC TTCTCATTCC CAACCTGTCT CATAGTTTAT CTTACCTGCC				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGGCCTCCTT GGGCACCTTT TGACCTTTTA GCTAGACTGA ACCCTTCTTA				
pDonor-1	TGGCCTCCTT GGGCACCTTT TGACCTTTTA GCTAGACTGA ACCCTTCTTA				
pDonor-2	TGGCCTCCTT GGGCACCTTT TGACCTTTTA GCTAGACTGA ACCCTTCTTA				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACAGAAGGAA CAAGGTCAGA GACAAGACGT GATCTGGTGA CAATGTCAAG				
pDonor-1	ACAGAAGGAA CAAGGTCAGA GACAAGACGT GATCTGGTGA CAATGTCAAG				
pDonor-2	ACAGAAGGAA CAAGGTCAGA GACAAGACGT GATCTGGTGA CAATGTCAAG				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGGATCGGTG GCAGAACCAA GACCAGAATT CCAGTGCCTC TTTCTTCTGG				
pDonor-1	TGGATCGGTG GCAGAACCAA GACCAGAATT CCAGTGCCTC TTTCTTCTGG				
pDonor-2	TGGATCGGTG GCAGAACCAA GACCAGAATT CCAGTGCCTC TTTCTTCTGG				

***NRAMP1* promoter (1742bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGATCTCTTT GGCCTGAATC TTCAGTGTAT GTCCCCGTGG CAGTAGCCGG				
pDonor-1	GGATCTCTTT GGCCTGAATC TTCAGTGTAT GTCCCCGTGG CAGTAGCCGG				
pDonor-2	GGATCTCTTT GGCCTGAATC TTCAGTGTAT GTCCCCGTGG CAGTAGCCGG				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AAGATCTTTC CCTCTAAGGC ACTCAGTGGG AACTGAGAC CTAGACAGCC				
pDonor-1	AAGATCTTTC CCTCTAAGGC ACTCAGTGGG AACTGAGAC CTAGACAGCC				
pDonor-2	AAGATCTTTC CCTCTAAGGC ACTCAGTGGG AACTGAGAC CTAGACAGCC				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATCAGAACTC CCTTCCTCCC CGTGGCCATG GGACCCAAGA TTAAAAAGGA				
pDonor-1	ATCAGAACTC CCTTCCTCCC CGTGGCCATG GGACCCAAGA TTAAAAAGGA				
pDonor-2	ATCAGAACTC CCTTCCTCCC CGTGGCCATG GGACCCAAGA TTAAAAAGGA				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GAAGGACCTG ACTGCTTGTA CAGGGTGAGG GTGGGCTAGC GGGCAGTCAC				
pDonor-1	GAAGGACCTG ACTGCTTGTA CAGGGTGAGG GTGGGCTAGC GGGCAGTCAC				
pDonor-2	GAAGGACCTG ACTGCTTGTA CAGGGTGAGG GTGGGCTAGC GGGCAGTCAC				

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GTGATCTAGA CATGCATGCC CAAGTGCCAG GAAGTTGTCC AAAATCAGAG				
pDonor-1	GTGATCTAGA CATGCATGCC CAAGTGCCAG GAAGTTGTCC AAAATCAGAG				
pDonor-2	GTGATCTAGA CATGCATGCC CAAGTGCCAG GAAGTTGTCC AAAATCAGAG				

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTAACTTGGG	AGAGGTGCAG	AACTCAGAGT	GCCTGGAAGG	GAGCCAGAGG
pDonor-1	CTAACTTGGG	AGAGGTGCAG	AACTCAGAGT	GCCTGGAAGG	GAGCCAGAGG
pDonor-2	CTAACTTGGG	AGAGGTGCAG	AACTCAGAGT	GCCTGGAAGG	GAGCCAGAGG

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGTTGTGGGG	CTCAGGCCAG	GAGGGGAACA	AATGTCCTTG	CTGTGGCCAC
pDonor-1	TGTTGTGGGG	CTCAGGCCAG	GAGGGGAACA	AATGTCCTTG	CTGTGGCCAC
pDonor-2	TGTTGTGGGG	CTCAGGCCAG	GAGGGGAACA	AATGTCCTTG	CTGTGGCCAC

**NRAMP1 promoter (1742bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCAGACCCTT	CCTCCAGAAC	TGGCCACTTC	TGCCTTTGGA	AAGTGTTTCA
pDonor-1	CCAGACCCTT	CCTCCAGAAC	TGGCCACTTC	TGCCTTTGGA	AAGTGTTTCA
pDonor-2	CCAGACCCTT	CCTCCAGAAC	TGGCCACTTC	TGCCTTTGGA	AAGTGTTTCA

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CAACGTGCCT	GCGTGTGAGG	ACAGCTGAGG	ATGGCTAAGA	GGGCGTGGAC
pDonor-1	CAACGTGCCT	GCGTGTGAGG	ACAGCTGAGG	ATGGCTAAGA	GGGCGTGGAC
pDonor-2	CAACGTGCCT	GCGTGTGAGG	ACAGCTGAGG	ATGGCTAAGA	GGGCGTGGAC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCGCACAATC	GCCACCGCCT	AGAGAGGAAG	CACCCGGTAC	CGCCACCATG
pDonor-1	CCGCACAATC	GCCACCGCCT	AGAGAGGAAG	CACCCGGTAC	CGCCACCATG
pDonor-2	CCGCACAATC	GCCACCGCCT	AGAGAGGAAG	CACCCGGTAC	CGCCACCATG

→ **Kpn I** **Kozak** ←

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCAGGTGACA	CGGGCCCCC	AAAGCAGGGA	GGGACCAGAT	ATGGCTCCAT
pDonor-1	TCAGGTGACA	CGGGCCCCC	AAAGCAGGGA	GGGACCAGAT	ATGGCTCCAT
pDonor-2	TCAGGTGACA	CGGGCCCCC	AAAGCAGGGA	GGGACCAGAT	ATGGCTCCAT

**NRAMP1 coding sequence (1647bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTCCAGCCCA	CCCAGTCCAG	AGCCACAGCA	AGCACCTCCC	GGAGGGACCT
pDonor-1	CTCCAGCCCA	CCCAGTCCAG	AGCCACAGCA	AGCACCTCCC	GGAGGGACCT
pDonor-2	CTCCAGCCCA	CCCAGTCCAG	AGCCACAGCA	AGCACCTCCC	GGAGGGACCT

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACCTAAGTGA	GAAGATCCCC	ATTCCGGATA	CAGAATCGGG	TGCATTTCAGC
pDonor-1	ACCTAAGTGA	GAAGATCCCC	ATTCCGGATA	CAGAATCGGG	TGCATTTCAGC
pDonor-2	ACCTAAGTGA	GAAGATCCCC	ATTCCGGATA	CAGAATCGGG	TGCATTTCAGC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTGCGGAAGC	TGTGGGCCTT	CACGGGGCCT	GGATTCCTCA	TGAGCATCGC
pDonor-1	CTGCGGAAGC	TGTGGGCCTT	CACGGGGCCT	GGATTCCTCA	TGAGCATCGC
pDonor-2	CTGCGGAAGC	TGTGGGCCTT	CACGGGGCCT	GGATTCCTCA	TGAGCATCGC



---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATTCCTGGAC	CCAGGAAACA	TTGAGTCGGA	TCTTCAGGCT	GGGGCTGTGG
pDonor-1	ATTCCTGGAC	CCAGGAAACA	TTGAGTCGGA	TCTTCAGGCT	GGGGCTGTGG
pDonor-2	ATTCCTGGAC	CCAGGAAACA	TTGAGTCGGA	TCTTCAGGCT	GGGGCTGTGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTGGATTCAA	ACTGCTCTGG	GTGCTGCTGT	GGGCCACAGT	GTTGGGCTTG
pDonor-1	CTGGATTCAA	ACTGCTCTGG	GTGCTGCTGT	GGGCCACAGT	GTTGGGCTTG
pDonor-2	CTGGATTCAA	ACTGCTCTGG	GTGCTGCTGT	GGGCCACAGT	GTTGGGCTTG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTTTGCCAGC	GACTGGCTGC	CCGGCTGGGC	GTGGTGACAG	GCAAGGACTT
pDonor-1	CTTTGCCAGC	GACTGGCTGC	CCGGCTGGGC	GTGGTGACAG	GCAAGGACTT
pDonor-2	CTTTGCCAGC	GACTGGCTGC	CCGGCTGGGC	GTGGTGACAG	GCAAGGACTT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGGCGAGGTC	TGCCATCTCT	ACTACCCTAA	GGTGCCCCGC	ATTCTCCTCT
pDonor-1	GGGCGAGGTC	TGCCATCTCT	ACTACCCTAA	GGTGCCCCGC	ATTCTCCTCT
pDonor-2	GGGCGAGGTC	TGCCATCTCT	ACTACCCTAA	GGTGCCCCGC	ATTCTCCTCT

***NRAMP1* coding sequence (1647bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGCTGACCAT	CGAGCTAGCC	ATCGTGGGCT	CAGACATGCA	GGAAGTCATT
pDonor-1	GGCTGACCAT	CGAGCTAGCC	ATCGTGGGCT	CAGACATGCA	GGAAGTCATT
pDonor-2	GGCTGACCAT	CGAGCTAGCC	ATCGTGGGCT	CAGACATGCA	GGAAGTCATT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGCACAGCTA	TTGCATT CAG	TCTGCTCTCC	GCCGGACGAA	TCCCACTCTG
pDonor-1	GGCACAGCTA	TTGCATT CAG	TCTGCTCTCC	GCCGGACGAA	TCCCACTCTG
pDonor-2	GGCACAGCTA	TTGCATT CAG	TCTGCTCTCC	GCCGGACGAA	TCCCACTCTG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGGTGGTGTC	CTCATCACCG	TCGTGGACAC	TTTCTTCTTC	CTCTTCCTCG
pDonor-1	GGGTGGTGTC	CTCATCACCG	TCGTGGACAC	TTTCTTCTTC	CTCTTCCTCG
pDonor-2	GGGTGGTGTC	CTCATCACCG	TCGTGGACAC	TTTCTTCTTC	CTCTTCCTCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATAACTACGG	GTTGCGGAAG	CTGGAAGCCT	TTTTTGGATT	TCTTATTACC
pDonor-1	ATAACTACGG	GTTGCGGAAG	CTGGAAGCCT	TTTTTGGATT	TCTTATTACC
pDonor-2	ATAACTACGG	GTTGCGGAAG	CTGGAAGCCT	TTTTTGGATT	TCTTATTACC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATAATGGCCT	TGACCTTCGG	CTATGAGTAC	GTGGTGGCTC	AGCCTGCTCA
pDonor-1	ATAATGGCCT	TGACCTTCGG	CTATGAGTAC	GTGGTGGCTC	AGCCTGCTCA
pDonor-2	ATAATGGCCT	TGACCTTCGG	CTATGAGTAC	GTGGTGGCTC	AGCCTGCTCA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGGAGCATTG	CTTCAGGGCC	TGTTCCCTGCC	CTCGTGCCCA	GGCTGTGGCC
pDonor-1	GGGAGCATTG	CTTCAGGGCC	TGTTCCCTGCC	CTCGTGCCCA	GGCTGTGGCC
pDonor-2	GGGAGCATTG	CTTCAGGGCC	TGTTCCCTGCC	CTCGTGCCCA	GGCTGTGGCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGCCCAGAGCT	GCTGCAAGCC	GTGGGCATCA	TTGGCGCCAT	CATCATGCCC
pDonor-1	AGCCCAGAGCT	GCTGCAAGCC	GTGGGCATCA	TTGGCGCCAT	CATCATGCCC
pDonor-2	AGCCCAGAGCT	GCTGCAAGCC	GTGGGCATCA	TTGGCGCCAT	CATCATGCCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CACAACATCT	ACCTGCATTC	CTCCCTGGTC	AAGTCTCGAG	AGGTAGACCG
pDonor-1	CACAACATCT	ACCTGCATTC	CTCCCTGGTC	AAGTCTCGAG	AGGTAGACCG
pDonor-2	CACAACATCT	ACCTGCATTC	CTCCCTGGTC	AAGTCTCGAG	AGGTAGACCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GTCCCAGCGG	GCGGACATCC	GAGAGGCCAA	CATGTACTTC	CTGATTGAAG
pDonor-1	GTCCCAGCGG	GCGGACATCC	GAGAGGCCAA	CATGTACTTC	CTGATTGAAG
pDonor-2	GTCCCAGCGG	GCGGACATCC	GAGAGGCCAA	CATGTACTTC	CTGATTGAAG

***NRAMP1* coding sequence (1647bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCACCATCGC	CCTGTCTGTC	TCCTTCCTCA	TCAACCTGTT	TGTCATGGCT
pDonor-1	CCACCATCGC	CCTGTCTGTC	TCCTTCCTCA	TCAACCTGTT	TGTCATGGCT
pDonor-2	CCACCATCGC	CCTGTCTGTC	TCCTTCCTCA	TCAACCTGTT	TGTCATGGCT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GTCTTTGGGC	AAGCCTTCTA	CAAGCAAACC	AACCAGGCTG	CGTTCAACAT
pDonor-1	GTCTTTGGGC	AAGCCTTCTA	CAAGCAAACC	AACCAGGCTG	CGTTCAACAT
pDonor-2	GTCTTTGGGC	AAGCCTTCTA	CAAGCAAACC	AACCAGGCTG	CGTTCAACAT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTGTGCCGAC	AGCAGCCTCC	ACGACTACGC	GCCGATCTTT	CCCAGGAACA
pDonor-1	CTGTGCCGAC	AGCAGCCTCC	ACGACTACGC	GCCGATCTTT	CCCAGGAACA
pDonor-2	CTGTGCCGAC	AGCAGCCTCC	ACGACTACGC	GCCGATCTTT	CCCAGGAACA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACCTGACCGT	GGCAGTGGAC	ATTTACCAAG	GAGGCGTGAT	CCTGGGCTGC
pDonor-1	ACCTGACCGT	GGCAGTGGAC	ATTTACCAAG	GAGGCGTGAT	CCTGGGCTGC
pDonor-2	ACCTGACCGT	GGCAGTGGAC	ATTTACCAAG	GAGGCGTGAT	CCTGGGCTGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTCTTTGGTC	CTCCAGCCCT	GTACATCTGG	GCCGTGGGTC	TCCTGGCTGC
pDonor-1	CTCTTTGGTC	CTCCAGCCCT	GTACATCTGG	GCCGTGGGTC	TCCTGGCTGC
pDonor-2	CTCTTTGGTC	CTCCAGCCCT	GTACATCTGG	GCCGTGGGTC	TCCTGGCTGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGGGCAGAGC	TCCACCATGA	CCGGCACCTA	CGCGGGACAG	TTTGTGATGG
pDonor-1	TGGGCAGAGC	TCCACCATGA	CCGGCACCTA	CGCGGGACAG	TTTGTGATGG
pDonor-2	TGGGCAGAGC	TCCACCATGA	CCGGCACCTA	CGCGGGACAG	TTTGTGATGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGGGCTTCCT	GAAGCTGCGG	TGGTCACGCT	TCGCCCAGT	CCTGCTCACT
pDonor-1	AGGGCTTCCT	GAAGCTGCGG	TGGTCACGCT	TCGCCCAGT	CCTGCTCACT
pDonor-2	AGGGCTTCCT	GAAGCTGCGG	TGGTCACGCT	TCGCCCAGT	CCTGCTCACT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGCTCCTGCG	CCATCCTGCC	CACTGTGCTC	CTGGCTGTCT	TCAGGGACTT
pDonor-1	CGCTCCTGCG	CCATCCTGCC	CACTGTGCTC	CTGGCTGTCT	TCAGGGACTT
pDonor-2	CGCTCCTGCG	CCATCCTGCC	CACTGTGCTC	CTGGCTGTCT	TCAGGGACTT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCGGGACCTG	TCAGGCCTCA	ACGACCTGCT	CAATGTGCTG	CAGAGCCTGC
pDonor-1	GCGGGACCTG	TCAGGCCTCA	ACGACCTGCT	CAATGTGCTG	CAGAGCCTGC
pDonor-2	GCGGGACCTG	TCAGGCCTCA	ACGACCTGCT	CAATGTGCTG	CAGAGCCTGC

***NRAMP1* coding sequence (1647bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGCTTCCCTT	CGCTGTGCTG	CCCATCCTCA	CCTTCACCAG	CATGCCCCGCC
pDonor-1	TGCTTCCCTT	CGCTGTGCTG	CCCATCCTCA	CCTTCACCAG	CATGCCCCGCC
pDonor-2	TGCTTCCCTT	CGCTGTGCTG	CCCATCCTCA	CCTTCACCAG	CATGCCCCGCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTGATGCAGG	AGTTTGCCAA	TGGCCTGGTG	AGCAAAGTTA	TCACTTCCTC
pDonor-1	CTGATGCAGG	AGTTTGCCAA	TGGCCTGGTG	AGCAAAGTTA	TCACTTCCTC
pDonor-2	CTGATGCAGG	AGTTTGCCAA	TGGCCTGGTG	AGCAAAGTTA	TCACTTCCTC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CATCATGGTG	CTGGTCTGCG	CCGTCAACCT	TTACTTCGTG	ATCAGCTACT
pDonor-1	CATCATGGTG	CTGGTCTGCG	CCGTCAACCT	TTACTTCGTG	ATCAGCTACT
pDonor-2	CATCATGGTG	CTGGTCTGCG	CCGTCAACCT	TTACTTCGTG	ATCAGCTACT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGCCCAGCCT	CCCCCACCCT	GCCTACTTCA	GCCTTGTAGC	ACTGCTGGCC
pDonor-1	TGCCCAGCCT	CCCCCACCCT	GCCTACTTCA	GCCTTGTAGC	ACTGCTGGCC
pDonor-2	TGCCCAGCCT	CCCCCACCCT	GCCTACTTCA	GCCTTGTAGC	ACTGCTGGCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCAGCCTACC	TGGGCCTCAC	CACTTACCTG	GTCTGGACCT	GTCTCATCAC
pDonor-1	GCAGCCTACC	TGGGCCTCAC	CACTTACCTG	GTCTGGACCT	GTCTCATCAC
pDonor-2	GCAGCCTACC	TGGGCCTCAC	CACTTACCTG	GTCTGGACCT	GTCTCATCAC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCAGGGAGCC	ACTCTTCTGG	CCCACAGTTC	CCACCAACGC	TTCCTGTATG
pDonor-1	CCAGGGAGCC	ACTCTTCTGG	CCCACAGTTC	CCACCAACGC	TTCCTGTATG
pDonor-2	CCAGGGAGCC	ACTCTTCTGG	CCCACAGTTC	CCACCAACGC	TTCCTGTATG

**NRAMP1 coding sequence (1647bp)**

**BamH I**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGCTTCCTGA	AGAGGATCAG	GAGAAGGGGA	GGACCTCGGG	ATGAGGATCC
pDonor-1	GGCTTCCTGA	AGAGGATCAG	GAGAAGGGGA	GGACCTCGGG	ATGAGGATCC
pDonor-2	GGCTTCCTGA	AGAGGATCAG	GAGAAGGGGA	GGACCTCGGG	ATGAGGATCC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACCGGATCTA	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT
pDonor-1	ACCGGATCTA	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT
pDonor-2	ACCGGATCTA	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TTTACTTGCT	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA
pDonor-1	TTTACTTGCT	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA
pDonor-2	TTTACTTGCT	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA

**SV40 polyA (245bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AAATGAATGC	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT
pDonor-1	AAATGAATGC	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT
pDonor-2	AAATGAATGC	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TACAAATAAA	GCAATAGCAT	CACAAATTC	ACAAATAAAG	CATTTTTTTC
pDonor-1	TACAAATAAA	GCAATAGCAT	CACAAATTC	ACAAATAAAG	CATTTTTTTC
pDonor-2	TACAAATAAA	GCAATAGCAT	CACAAATTC	ACAAATAAAG	CATTTTTTTC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACTGCATTCT	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG
pDonor-1	ACTGCATTCT	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG
pDonor-2	ACTGCATTCT	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG

**Spe I**

**LoxP (34bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TACTAGTATA	ACTTCGTATA	GCATACATTA	TACGAAGTTA	TTGCGTTATC
pDonor-1	TACTAGTATA	ACTTCGTATA	GCATACATTA	TACGAAGTTA	TTGCGTTATC
pDonor-2	TACTAGTATA	ACTTCGTATA	GCATACATTA	TACGAAGTTA	TTGCGTTATC

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCCTGATTCT	GTGGATAACC	GTATTACCGC	CATGCATTAG	TTATTAATAT
pDonor-1	CCCTGATTCT	GTGGATAACC	GTATTACCGC	CATGCATTAG	TTATTAATAT
pDonor-2	CCCTGATTCT	GTGGATAACC	GTATTACCGC	CATGCATTAG	TTATTAATAT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCCAGGGACC	GTCGTTAAAC	TCCCCTAAC	GTAGAACCCA	GAGATCGCTG
pDonor-1	CCCAGGGACC	GTCGTTAAAC	TCCCCTAAC	GTAGAACCCA	GAGATCGCTG
pDonor-2	CCCAGGGACC	GTCGTTAAAC	TCCCCTAAC	GTAGAACCCA	GAGATCGCTG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGTTCCTGCC	CCCTCACCCG	CCCCTCTCTG	TCATCACTGA	GGTGGAGAAG
pDonor-1	CGTTCCTGCC	CCCTCACCCG	CCCCTCTCTG	TCATCACTGA	GGTGGAGAAG
pDonor-2	CGTTCCTGCC	CCCTCACCCG	CCCCTCTCTG	TCATCACTGA	GGTGGAGAAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGCATGCGTG	AGGCTCCGGT	GCCCGTCAGT	GGGCAGAGCG	CACATCGCCC
pDonor-1	AGCATGCGTG	AGGCTCCGGT	GCCCGTCAGT	GGGCAGAGCG	CACATCGCCC
pDonor-2	AGCATGCGTG	AGGCTCCGGT	GCCCGTCAGT	GGGCAGAGCG	CACATCGCCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ACAGTCCCCG	AGAAGTTGGG	GGGAGGGGTC	GGCAATTGAA	CCGGTGCCTA
pDonor-1	ACAGTCCCCG	AGAAGTTGGG	GGGAGGGGTC	GGCAATTGAA	CCGGTGCCTA
pDonor-2	ACAGTCCCCG	AGAAGTTGGG	GGGAGGGGTC	GGCAATTGAA	CCGGTGCCTA

---

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GAGAAGGTGG	CGCGGGGTAA	ACTGGGAAAAG	TGATGTCGTG	TACTGGCTCC
pDonor-1	GAGAAGGTGG	CGCGGGGTAA	ACTGGGAAAAG	TGATGTCGTG	TACTGGCTCC
pDonor-2	GAGAAGGTGG	CGCGGGGTAA	ACTGGGAAAAG	TGATGTCGTG	TACTGGCTCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCCTTTTTCC	CGAGGGTGGG	GGAGAACCGT	ATATAAGTGC	AGTAGTCGCC
pDonor-1	GCCTTTTTCC	CGAGGGTGGG	GGAGAACCGT	ATATAAGTGC	AGTAGTCGCC
pDonor-2	GCCTTTTTCC	CGAGGGTGGG	GGAGAACCGT	ATATAAGTGC	AGTAGTCGCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GTGAACGTTT	TTTTTCGCAA	CGGGTTTGCC	GCCAGAACAC	AGGTAAGTGC
pDonor-1	GTGAACGTTT	TTTTTCGCAA	CGGGTTTGCC	GCCAGAACAC	AGGTAAGTGC
pDonor-2	GTGAACGTTT	TTTTTCGCAA	CGGGTTTGCC	GCCAGAACAC	AGGTAAGTGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGTGTGTGGT	TCCCCTGGGC	CTGGCCTCTT	TACGGGTTAT	GGCCCTTGCG
pDonor-1	CGTGTGTGGT	TCCCCTGGGC	CTGGCCTCTT	TACGGGTTAT	GGCCCTTGCG
pDonor-2	CGTGTGTGGT	TCCCCTGGGC	CTGGCCTCTT	TACGGGTTAT	GGCCCTTGCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGCCTTGAAT	TACTTCCACG	CCCCTGGCTG	CAGTACGTGA	TTCTTGATCC
pDonor-1	TGCCTTGAAT	TACTTCCACG	CCCCTGGCTG	CAGTACGTGA	TTCTTGATCC
pDonor-2	TGCCTTGAAT	TACTTCCACG	CCCCTGGCTG	CAGTACGTGA	TTCTTGATCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGAGCTTCGG	GTTGGAAGTG	GGTGGGAGAG	TTCGAGGCCT	TGCGCTTAAG
pDonor-1	CGAGCTTCGG	GTTGGAAGTG	GGTGGGAGAG	TTCGAGGCCT	TGCGCTTAAG
pDonor-2	CGAGCTTCGG	GTTGGAAGTG	GGTGGGAGAG	TTCGAGGCCT	TGCGCTTAAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GAGCCCCTTC	GCCTCGTGCT	TGAGTTGAGG	CCTGGCTTGG	GCGCTGGGGC
pDonor-1	GAGCCCCTTC	GCCTCGTGCT	TGAGTTGAGG	CCTGGCTTGG	GCGCTGGGGC
pDonor-2	GAGCCCCTTC	GCCTCGTGCT	TGAGTTGAGG	CCTGGCTTGG	GCGCTGGGGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGCCGCGTGC	GAATCTGGTG	GCACCTTCGC	GCCTGTCTCG	CTGCTTTTCGA
pDonor-1	CGCCGCGTGC	GAATCTGGTG	GCACCTTCGC	GCCTGTCTCG	CTGCTTTTCGA
pDonor-2	CGCCGCGTGC	GAATCTGGTG	GCACCTTCGC	GCCTGTCTCG	CTGCTTTTCGA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TAAGTCTCTA	GCCATTTAAA	ATTTTTGATG	ACCTGCTGCG	ACGCTTTTTT
pDonor-1	TAAGTCTCTA	GCCATTTAAA	ATTTTTGATG	ACCTGCTGCG	ACGCTTTTTT
pDonor-2	TAAGTCTCTA	GCCATTTAAA	ATTTTTGATG	ACCTGCTGCG	ACGCTTTTTT

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCTGGCAAGA	TAGTCTTGTA	AATGCGGGCC	AAGATCTGCA	CACTGGTATT
pDonor-1	TCTGGCAAGA	TAGTCTTGTA	AATGCGGGCC	AAGATCTGCA	CACTGGTATT
pDonor-2	TCTGGCAAGA	TAGTCTTGTA	AATGCGGGCC	AAGATCTGCA	CACTGGTATT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCGGTTTTTG	GGGCCGCGGG	CGGCGACGGG	GCCCGTGCGT	CCCAGCGCAC
pDonor-1	TCGGTTTTTG	GGGCCGCGGG	CGGCGACGGG	GCCCGTGCGT	CCCAGCGCAC
pDonor-2	TCGGTTTTTG	GGGCCGCGGG	CGGCGACGGG	GCCCGTGCGT	CCCAGCGCAC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATGTTTCGGCG	AGGCGGGGCC	TGCGAGCGCG	GCCACCGAGA	ATCGGACGGG
pDonor-1	ATGTTTCGGCG	AGGCGGGGCC	TGCGAGCGCG	GCCACCGAGA	ATCGGACGGG
pDonor-2	ATGTTTCGGCG	AGGCGGGGCC	TGCGAGCGCG	GCCACCGAGA	ATCGGACGGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGTAGTCTCA	AGCTGGCCGG	CCTGCTCTGG	TGCCTGGCCT	CGCGCCGCCG
pDonor-1	GGTAGTCTCA	AGCTGGCCGG	CCTGCTCTGG	TGCCTGGCCT	CGCGCCGCCG
pDonor-2	GGTAGTCTCA	AGCTGGCCGG	CCTGCTCTGG	TGCCTGGCCT	CGCGCCGCCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGTATCGCCC	CGCCCTGGGC	GGCAAGGCTG	GCCCGGTCGG	CACCAGTTGC
pDonor-1	TGTATCGCCC	CGCCCTGGGC	GGCAAGGCTG	GCCCGGTCGG	CACCAGTTGC
pDonor-2	TGTATCGCCC	CGCCCTGGGC	GGCAAGGCTG	GCCCGGTCGG	CACCAGTTGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GTGAGCGGAA	AGATGGCCGC	TTCCCGGCC	TGCTGCAGGG	AGCTCAAAT
pDonor-1	GTGAGCGGAA	AGATGGCCGC	TTCCCGGCC	TGCTGCAGGG	AGCTCAAAT
pDonor-2	GTGAGCGGAA	AGATGGCCGC	TTCCCGGCC	TGCTGCAGGG	AGCTCAAAT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGAGGACGCG	GCGCTCGGGA	GAGCGGGCGG	GTGAGTCACC	CACACAAAGG
pDonor-1	GGAGGACGCG	GCGCTCGGGA	GAGCGGGCGG	GTGAGTCACC	CACACAAAGG
pDonor-2	GGAGGACGCG	GCGCTCGGGA	GAGCGGGCGG	GTGAGTCACC	CACACAAAGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AAAAGGGCCT	TTCCGTCCTC	AGCCGTCGCT	TCATGTGACT	CCACGGAGTA
pDonor-1	AAAAGGGCCT	TTCCGTCCTC	AGCCGTCGCT	TCATGTGACT	CCACGGAGTA
pDonor-2	AAAAGGGCCT	TTCCGTCCTC	AGCCGTCGCT	TCATGTGACT	CCACGGAGTA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCGGGCGCCG	TCCAGGCACC	TCGATTAGTT	CTCGAGCTTT	TGGAGTACGT
pDonor-1	CCGGGCGCCG	TCCAGGCACC	TCGATTAGTT	CTCGAGCTTT	TGGAGTACGT
pDonor-2	CCGGGCGCCG	TCCAGGCACC	TCGATTAGTT	CTCGAGCTTT	TGGAGTACGT

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CGTCTTTAGG	TTGGGGGGAG	GGGTTTTATG	CGATGGAGTT	TCCCCACACT
pDonor-1	CGTCTTTAGG	TTGGGGGGAG	GGGTTTTATG	CGATGGAGTT	TCCCCACACT
pDonor-2	CGTCTTTAGG	TTGGGGGGAG	GGGTTTTATG	CGATGGAGTT	TCCCCACACT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GAGTGGGTGG	AGACTGAAGT	TAGGCCAGCT	TGGCACTTGA	TGTAATTCTC
pDonor-1	GAGTGGGTGG	AGACTGAAGT	TAGGCCAGCT	TGGCACTTGA	TGTAATTCTC
pDonor-2	GAGTGGGTGG	AGACTGAAGT	TAGGCCAGCT	TGGCACTTGA	TGTAATTCTC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTTGGAATTT	GCCCTTTTTG	AGTTTGGATC	TTGGTTCATT	CTCAAGCCTC
pDonor-1	CTTGGAATTT	GCCCTTTTTG	AGTTTGGATC	TTGGTTCATT	CTCAAGCCTC
pDonor-2	CTTGGAATTT	GCCCTTTTTG	AGTTTGGATC	TTGGTTCATT	CTCAAGCCTC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGACAGTGGT	TCAAAGTTTT	TTTCTTCCAT	TTCAGGTGTC	GTGAGCTAGC
pDonor-1	AGACAGTGGT	TCAAAGTTTT	TTTCTTCCAT	TTCAGGTGTC	GTGAGCTAGC
pDonor-2	AGACAGTGGT	TCAAAGTTTT	TTTCTTCCAT	TTCAGGTGTC	GTGAGCTAGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCTACCGGTC	GCCACCATGG	TGAGCAAGGG	CGAGGAGCTG	TTCACCGGGG
pDonor-1	GCTACCGGTC	GCCACCATGG	TGAGCAAGGG	CGAGGAGCTG	TTCACCGGGG
pDonor-2	GCTACCGGTC	GCCACCATGG	TGAGCAAGGG	CGAGGAGCTG	TTCACCGGGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGGTGCCCAT	CCTGGTCGAG	CTGGACGGCG	ACGTAAACGG	CCACAAGTTC
pDonor-1	TGGTGCCCAT	CCTGGTCGAG	CTGGACGGCG	ACGTAAACGG	CCACAAGTTC
pDonor-2	TGGTGCCCAT	CCTGGTCGAG	CTGGACGGCG	ACGTAAACGG	CCACAAGTTC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGCGTGTCCG	GCGAGGGCGA	GGGCGATGCC	ACCTACGGCA	AGCTGACCCT
pDonor-1	AGCGTGTCCG	GCGAGGGCGA	GGGCGATGCC	ACCTACGGCA	AGCTGACCCT
pDonor-2	AGCGTGTCCG	GCGAGGGCGA	GGGCGATGCC	ACCTACGGCA	AGCTGACCCT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GAAGTTCATC	TGCACCACCG	GCAAGCTGCC	CGTGCCCTGG	CCCACCCTCG
pDonor-1	GAAGTTCATC	TGCACCACCG	GCAAGCTGCC	CGTGCCCTGG	CCCACCCTCG
pDonor-2	GAAGTTCATC	TGCACCACCG	GCAAGCTGCC	CGTGCCCTGG	CCCACCCTCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGACCACCCT	GACCTACGGC	GTGCAGTGCT	TCAGCCGCTA	CCCCGACCAC
pDonor-1	TGACCACCCT	GACCTACGGC	GTGCAGTGCT	TCAGCCGCTA	CCCCGACCAC
pDonor-2	TGACCACCCT	GACCTACGGC	GTGCAGTGCT	TCAGCCGCTA	CCCCGACCAC

---

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATGAAGCAGC	ACGACTTCTT	CAAGTCCGCC	ATGCCCGAAG	GCTACGTCCA
pDonor-1	ATGAAGCAGC	ACGACTTCTT	CAAGTCCGCC	ATGCCCGAAG	GCTACGTCCA
pDonor-2	ATGAAGCAGC	ACGACTTCTT	CAAGTCCGCC	ATGCCCGAAG	GCTACGTCCA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGAGCGCACC	ATCTTCTTCA	AGGACGACGG	CAACTACAAG	ACCCGCGCCG
pDonor-1	GGAGCGCACC	ATCTTCTTCA	AGGACGACGG	CAACTACAAG	ACCCGCGCCG
pDonor-2	GGAGCGCACC	ATCTTCTTCA	AGGACGACGG	CAACTACAAG	ACCCGCGCCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGGTGAAGTT	CGAGGGCGAC	ACCCTGGTGA	ACCGCATCGA	GCTGAAGGGC
pDonor-1	AGGTGAAGTT	CGAGGGCGAC	ACCCTGGTGA	ACCGCATCGA	GCTGAAGGGC
pDonor-2	AGGTGAAGTT	CGAGGGCGAC	ACCCTGGTGA	ACCGCATCGA	GCTGAAGGGC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	ATCGACTTCA	AGGAGGACGG	CAACATCCTG	GGGCACAAGC	TGGAGTACAA
pDonor-1	ATCGACTTCA	AGGAGGACGG	CAACATCCTG	GGGCACAAGC	TGGAGTACAA
pDonor-2	ATCGACTTCA	AGGAGGACGG	CAACATCCTG	GGGCACAAGC	TGGAGTACAA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTACAACAGC	CACAACGTCT	ATATCATGGC	CGACAAGCAG	AAGAACGGCA
pDonor-1	CTACAACAGC	CACAACGTCT	ATATCATGGC	CGACAAGCAG	AAGAACGGCA
pDonor-2	CTACAACAGC	CACAACGTCT	ATATCATGGC	CGACAAGCAG	AAGAACGGCA



---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCAAGGTGAA	CTTCAAGATC	CGCCACAACA	TCGAGGACGG	CAGCGTGCAG
pDonor-1	TCAAGGTGAA	CTTCAAGATC	CGCCACAACA	TCGAGGACGG	CAGCGTGCAG
pDonor-2	TCAAGGTGAA	CTTCAAGATC	CGCCACAACA	TCGAGGACGG	CAGCGTGCAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTCGCCGACC	ACTACCAGCA	GAACACCCCC	ATCGGCGACG	GCCCCGTGCT
pDonor-1	CTCGCCGACC	ACTACCAGCA	GAACACCCCC	ATCGGCGACG	GCCCCGTGCT
pDonor-2	CTCGCCGACC	ACTACCAGCA	GAACACCCCC	ATCGGCGACG	GCCCCGTGCT

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCTGCCCGAC	AACCACTACC	TGAGCACCCA	GTCCGCCCTG	AGCAAAGACC
pDonor-1	GCTGCCCGAC	AACCACTACC	TGAGCACCCA	GTCCGCCCTG	AGCAAAGACC
pDonor-2	GCTGCCCGAC	AACCACTACC	TGAGCACCCA	GTCCGCCCTG	AGCAAAGACC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCAACGAGAA	GCGCGATCAC	ATGGTCCTGC	TGGAGTTCGT	GACCGCCGCC
pDonor-1	CCAACGAGAA	GCGCGATCAC	ATGGTCCTGC	TGGAGTTCGT	GACCGCCGCC
pDonor-2	CCAACGAGAA	GCGCGATCAC	ATGGTCCTGC	TGGAGTTCGT	GACCGCCGCC

---

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGGATCACTC	TCGGCATGGA	CGAGCTGTAC	AAGGGATCCG	GAGCCACGAA
pDonor-1	GGGATCACTC	TCGGCATGGA	CGAGCTGTAC	AAGGGATCCG	GAGCCACGAA
pDonor-2	GGGATCACTC	TCGGCATGGA	CGAGCTGTAC	AAGGGATCCG	GAGCCACGAA

**Probe 2-primer-1F**



WT-cow	-----	-----	-----	-----	-----
Trans-cow	CTTCTCTCTG	TTAAAGCAAG	CAGGAGACGT	GGAAGAAAAC	CCCGTCTCTA
pDonor-1	CTTCTCTCTG	TTAAAGCAAG	CAGGAGACGT	GGAAGAAAAC	CCCGTCTCTA
pDonor-2	CTTCTCTCTG	TTAAAGCAAG	CAGGAGACGT	GGAAGAAAAC	CCCGTCTCTA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TGACCGAGTA	CAAGCCCACG	GTGCGCCTCG	CCACCCGCGA	CGACGTCCCC
pDonor-1	TGACCGAGTA	CAAGCCCACG	GTGCGCCTCG	CCACCCGCGA	CGACGTCCCC
pDonor-2	TGACCGAGTA	CAAGCCCACG	GTGCGCCTCG	CCACCCGCGA	CGACGTCCCC

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AGGGCCGTAC	GCACCCTCGC	CGCCGCGTTC	GCCGACTACC	CCGCCACGCG
pDonor-1	AGGGCCGTAC	GCACCCTCGC	CGCCGCGTTC	GCCGACTACC	CCGCCACGCG
pDonor-2	AGGGCCGTAC	GCACCCTCGC	CGCCGCGTTC	GCCGACTACC	CCGCCACGCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCACACCGTC	GATCCGGACC	GCCACATCGA	GCGGGTCACC	GAGCTGCAAG
pDonor-1	CCACACCGTC	GATCCGGACC	GCCACATCGA	GCGGGTCACC	GAGCTGCAAG
pDonor-2	CCACACCGTC	GATCCGGACC	GCCACATCGA	GCGGGTCACC	GAGCTGCAAG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AACTCTTCCT	CACGCGCGTC	GGGCTCGACA	TCGGCAAGGT	GTGGGTCGCG
pDonor-1	AACTCTTCCT	CACGCGCGTC	GGGCTCGACA	TCGGCAAGGT	GTGGGTCGCG
pDonor-2	AACTCTTCCT	CACGCGCGTC	GGGCTCGACA	TCGGCAAGGT	GTGGGTCGCG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GACGACGGCG	CCGCGGTGGC	GGTCTGGACC	ACGCCGAGAG	GCGTCGAAGC
pDonor-1	GACGACGGCG	CCGCGGTGGC	GGTCTGGACC	ACGCCGAGAG	GCGTCGAAGC
pDonor-2	GACGACGGCG	CCGCGGTGGC	GGTCTGGACC	ACGCCGAGAG	GCGTCGAAGC

**3' Junction primer-F**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GGGGGCGGTG	TTCGCCGAGA	TCGGCCC <b>GCG</b>	<b>CATGGCCGAG</b>	<b>TTGAGCGGTT</b>
pDonor-1	GGGGGCGGTG	TTCGCCGAGA	TCGGCCC <b>GCG</b>	<b>CATGGCCGAG</b>	<b>TTGAGCGGTT</b>
pDonor-2	GGGGGCGGTG	TTCGCCGAGA	TCGGCCC <b>GCG</b>	<b>CATGGCCGAG</b>	<b>TTGAGCGGTT</b>

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCCGGCTGGC	CGCGCAGCAA	CAGATGGAAG	GCCTCCTGGC	GCCGCACCGG
pDonor-1	CCCGGCTGGC	CGCGCAGCAA	CAGATGGAAG	GCCTCCTGGC	GCCGCACCGG
pDonor-2	CCCGGCTGGC	CGCGCAGCAA	CAGATGGAAG	GCCTCCTGGC	GCCGCACCGG

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCCAAGGAGC	CCGCGTGGTT	CCTGGCCACC	GTCGGCGTCT	CGCCCGACCA
pDonor-1	CCCAAGGAGC	CCGCGTGGTT	CCTGGCCACC	GTCGGCGTCT	CGCCCGACCA
pDonor-2	CCCAAGGAGC	CCGCGTGGTT	CCTGGCCACC	GTCGGCGTCT	CGCCCGACCA

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCAGGGCAAG	GGTCTGGGCA	GCGCCGTCGT	GCTCCCCGGA	GTGGAGGCGG
pDonor-1	CCAGGGCAAG	GGTCTGGGCA	GCGCCGTCGT	GCTCCCCGGA	GTGGAGGCGG
pDonor-2	CCAGGGCAAG	GGTCTGGGCA	GCGCCGTCGT	GCTCCCCGGA	GTGGAGGCGG

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	CCGAGCGCGC	CGGGGTGCCC	GCCTTCCTGG	AGACCTCCGC	GCCCCG <b>AAC</b>
pDonor-1	CCGAGCGCGC	CGGGGTGCCC	GCCTTCCTGG	AGACCTCCGC	GCCCCG <b>AAC</b>
pDonor-2	CCGAGCGCGC	CGGGGTGCCC	GCCTTCCTGG	AGACCTCCGC	GCCCCG <b>AAC</b>

**Probe 2-primer-1R**

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	<b>CTCCCCTTCT</b>	<b>ACGAGCGGCT</b>	<b>CGGCTTCACC</b>	<b>GTCACCGCCG</b>	<b>ACGTCGAGGT</b>
pDonor-1	<b>CTCCCCTTCT</b>	<b>ACGAGCGGCT</b>	<b>CGGCTTCACC</b>	<b>GTCACCGCCG</b>	<b>ACGTCGAGGT</b>
pDonor-2	<b>CTCCCCTTCT</b>	<b>ACGAGCGGCT</b>	<b>CGGCTTCACC</b>	<b>GTCACCGCCG</b>	<b>ACGTCGAGGT</b>

---

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCCCCAAGGA	CCGCGCACCT	GGTGCATGAC	CCGCAAGCCC	GGTGCCTGAA
pDonor-1	GCCCCAAGGA	CCGCGCACCT	GGTGCATGAC	CCGCAAGCCC	GGTGCCTGAA
pDonor-2	GCCCCAAGGA	CCGCGCACCT	GGTGCATGAC	CCGCAAGCCC	GGTGCCTGAA

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TCTAGGTGGT	CAATCAACCG	GTACCGCGGG	CCCGGGATCC	ACCGGATCTA
pDonor-1	TCTAGGTGGT	CAATCAACCG	GTACCGCGGG	CCCGGGATCC	ACCGGATCTA
pDonor-2	TCTAGGTGGT	CAATCAACCG	GTACCGCGGG	CCCGGGATCC	ACCGGATCTA

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT	TTTACTTGCT
pDonor-1	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT	TTTACTTGCT
pDonor-2	GATAACTGAT	CATAATCAGC	CATACCACAT	TTGTAGAGGT	TTTACTTGCT

WT-cow	-----	-----	-----	-----	-----
Trans-cow	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA	AAATGAATGC
pDonor-1	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA	AAATGAATGC
pDonor-2	TTAAAAAACC	TCCCACACCT	CCCCCTGAAC	CTGAAACATA	AAATGAATGC

WT-cow	-----	-----	-----	-----	-----
Trans-cow	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT	TACAAATAAA
pDonor-1	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT	TACAAATAAA
pDonor-2	AATTGTTGTT	GTAACTTGT	TTATTGCAGC	TTATAATGGT	TACAAATAAA

**pEF1 $\alpha$ -eGFP-P2A-Puro cassette (3062bp)**

WT-cow	-----	-----	-----	-----	-----
Trans-cow	GCAATAGCAT	CACAAATTTT	ACAAATAAAG	CATTTTTTTT	ACTGCATTCT
pDonor-1	GCAATAGCAT	CACAAATTTT	ACAAATAAAG	CATTTTTTTT	ACTGCATTCT
pDonor-2	GCAATAGCAT	CACAAATTTT	ACAAATAAAG	CATTTTTTTT	ACTGCATTCT

WT-cow	--TATGTGCA	GTGTCGACGT	GCAGCTCCTT	GAATTGCCAC	TCACAGGTTC
Trans-cow	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG	TAAATTGTAA
pDonor-1	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG	TAAATTGTAA
pDonor-2	AGTTGTGGTT	TGTCCAAACT	CATCAATGTA	TCTTAACGCG	TAAATTGTAA

→
LoxP (34bp)
Cla I
←

WT-cow	CCAGCACCCA	GATCGACGTA	CAGGCCTAGG	GTCCAGAAG	CTTCCATCAC
Trans-cow	GCGATAACTT	CGTATAGCAT	ACATTATACG	AAGTTATATC	GAT-----AC
pDonor-1	GCGATAACTT	CGTATAGCAT	ACATTATACG	AAGTTATATC	GAT-----AC
pDonor-2	GCGATAACTT	CGTATAGCAT	ACATTATACG	AAGTTATATC	GAT-----AC

**Right homology arm (816bp/764bp)**

WT-cow	ACCCTTTCTA	GTGGTCCTCC	ACATAGGGCA	CCTTTGTCCT	GTCTTCTGCA
Trans-cow	ACCCTTTCTA	GTGGTCCTCC	ACATAGGGCA	CCTTTGTCCT	GTCTTCTGCA
pDonor-1	ACCCTTTCTA	GTGGTCCTCC	ACATAGGGCA	CCTTTGTCCT	GTCTTCTGCA
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CATAGATTGG	CTCCCTGTCT	TTAAACTCCA	CGAAAACAGG	ATCAGAGAGA
Trans-cow	CATAGATTGG	CTCCCTGTCT	TTAAACTCCA	CGAAAACAGG	ATCAGAGAGA
pDonor-1	CATAGATTGG	CTCCCTGTCT	TTAAACTCCA	CGAAAACAGG	ATCAGAGAGA
pDonor-2	----GATTGG	CTCCCTGTCT	TTAAACTCCA	CGAAAACAGG	ATCAGAGAGA

---

WT-cow	ATCCGTTCTT	GTGTGTGAAG	TGGGAGCTCA	CTGTGGTTTG	CATTTGCATT
Trans-cow	ATCCGTTCTT	GTGTGTGAAG	TGGGAGCTCA	CTGTGGTTTG	CATTTGCATT
pDonor-1	ATCCGTTCTT	GTGTGTGAAG	TGGGAGCTCA	CTGTGGTTTG	CATTTGCATT
pDonor-2	ATCCGTTCTT	GTGTGTGAAG	TGGGAGCTCA	CTGTGGTTTG	CATTTGCATT

---

WT-cow	TCACGGATGA	CCCGTGATGT	CGAGTCTCTT	CTTATCTTTC	CTGGCGATGT
Trans-cow	TCACGGATGA	CCCGTGATGT	CGAGTCTCTT	CTTATCTTTC	CTGGCGATGT
pDonor-1	TCACGGATGA	CCCGTGATGT	CGAGTCTCTT	CTTATCTTTC	CTGGCGATGT
pDonor-2	TCACGGATGA	CCCGTGATGT	CGAGTCTCTT	CTTATCTTTC	CTGGCGATGT

---

WT-cow	GGAGATTTGG	GTGGACTTTT	GTTTAAAATG	CCCCTTCAGG	GGTTTCCCTG
Trans-cow	GGAGATTTGG	GTGGACTTTT	GTTTAAAATG	CCCCTTCAGG	GGTTTCCCTG
pDonor-1	GGAGATTTGG	GTGGACTTTT	GTTTAAAATG	CCCCTTCAGG	GGTTTCCCTG
pDonor-2	GGAGATTTGG	GTGGACTTTT	GTTTAAAATG	CCCCTTCAGG	GGTTTCCCTG

---

WT-cow	GTGGCTGAGT	GGTAACGAAA	CTGCTTGCCA	ATGCAGTAAC	ACCAGGAAGA
Trans-cow	GTGGCTGAGT	GGTAACGAAA	CTGCTTGCCA	ATGCAGTAAC	ACCAGGAAGA
pDonor-1	GTGGCTGAGT	GGTAACGAAA	CTGCTTGCCA	ATGCAGTAAC	ACCAGGAAGA
pDonor-2	GTGGCTGAGT	GGTAACGAAA	CTGCTTGCCA	ATGCAGTAAC	ACCAGGAAGA

**Right homology arm (816bp/764bp)**

---

WT-cow	TCCTACATGC	CTTGGAGCAG	CTAAGCCCAT	GCTCCACGAC	TACTGAGCCT
Trans-cow	TCCTACATGC	CTTGGAGCAG	CTAAGCCCAT	GCTCCACGAC	TACTGAGCCT
pDonor-1	TCCTACATGC	CTTGGAGCAG	CTAAGCCCAT	GCTCCACGAC	TACTGAGCCT
pDonor-2	TCCTACATGC	CTTGGAGCAG	CTAAGCCCAT	GCTCCACGAC	TACTGAGCCT

**Surveyor-detect-primer-R**

---

WT-cow	GTGCTCTCGG	GCCCCGGAGC	CACGACGACA	GAGCCCTCGA	ACCGCAACTG
Trans-cow	GTGCTCTCGG	GCCCCGGAGC	CACGACGACA	GAGCCCTCGA	ACCGCAACTG
pDonor-1	GTGCTCTCGG	GCCCCGGAGC	CACGACGACA	GAGCCCTCGA	ACCGCAACTG
pDonor-2	GTGCTCTCGG	GCCCCGGAGC	CACGACGACA	GAGCCCTCGA	ACCGCAACTG

---

WT-cow	CTGAGGCCCG	TGTGCCTTGG	AGCCCCGAGCT	CCACAGCAAG	AGATGCACCA
Trans-cow	CTGAGGCCCG	TGTGCCTTGG	AGCCCCGAGCT	CCACAGCAAG	AGATGCACCA
pDonor-1	CTGAGGCCCG	TGTGCCTTGG	AGCCCCGAGCT	CCACAGCAAG	AGATGCACCA
pDonor-2	CTGAGGCCCG	TGTGCCTTGG	AGCCCCGAGCT	CCACAGCAAG	AGATGCACCA

---

WT-cow	TAAGGAGAGG	CCCGCACTCC	ACGACCAGAG	TAGCCCCCGC	TGGCCACAAC
Trans-cow	TAAGGAGAGG	CCCGCACTCC	ACGACCAGAG	TAGCCCCCGC	TGGCCACAAC
pDonor-1	TAAGGAGAGG	CCCGCACTCC	ACGACCAGAG	TAGCCCCCGC	TGGCCACAAC
pDonor-2	TAAGGAGAGG	CCCGCACTCC	ACGACCAGAG	TAGCCCCCGC	TGGCCACAAC

---

WT-cow	TAGAGAAAAA	CTTGTGCACA	GTAGAGAAGA	CCCAGGACAG	CCAAAAAAT
Trans-cow	TAGAGAAAAA	CTTGTGCACA	GTAGAGAAGA	CCCAGGACAG	CCAAAAAAT
pDonor-1	TAGAGAAAAA	CTTGTGCACA	GTAGAGAAGA	CCCAGGACAG	CCAAAAAAT
pDonor-2	TAGAGAAAAA	CTTGTGCACA	GTAGAGAAGA	CCCAGGACAG	CCAAAAAAT

WT-cow	CCAAAGAAAA	AGCCCCTTCA	GGGCCTTCT	TGGCAGTCCA	GTGATCAAGA
Trans-cow	CCAAAGAAAA	AGCCCCTTCA	GGGCCTTCT	TGGCAGTCCA	GTGATCAAGA
pDonor-1	CCAAAGAAAA	AGCCCCTTCA	GGGCCTTCT	TGGCAGTCCA	GTGATCAAGA
pDonor-2	CCAAAGAAAA	AGCCCCTTCA	GGGCCTTCT	TGGCAGTCCA	GTGATCAAGA

WT-cow	CTCTCGCCTC	CATTCAAGGG	CGCACGGGCT	TGATCCCTAG	TTGGGGAACT
Trans-cow	CTCTCGCCTC	CATTCAAGGG	CGCACGGGCT	TGATCCCTAG	TTGGGGAACT
pDonor-1	CTCTCGCCTC	CATTCAAGGG	CGCACGGGCT	TGATCCCTAG	TTGGGGAACT
pDonor-2	CTCTCGCCTC	CATTCAAGGG	CGCACGGGCT	TGATCCCTAG	TTGGGGAACT

WT-cow	TAGGATCCCG	AAAGTTGTGC	AGTACAGCCA	GAAATAATAA	TAATGATGAA
Trans-cow	TAGGATCCCG	AAAGTTGTGC	AGTACAGCCA	GAAATAATAA	TAATGATGAA
pDonor-1	TAGGATCCCG	AAAGTTGTGC	AGTACAGCCA	GAAATAATAA	TAATGATGAA
pDonor-2	TAGGATCCCG	AAAGTTGTGC	AGTACAGCCA	GAAATAATAA	TAATGATGAA

**Right homology arm (816bp/764bp)**

WT-cow	TAAATAAATA	AAATGCCCT	CCAGGTCTGT	TTCTCATTCC	CCTCCCTGCC
Trans-cow	TAAATAAATA	AAATGCCCT	CCAGGTCTGT	TTCTCATTCC	CCTCCCTGCC
pDonor-1	TAAATAAATA	AAATGCCCT	CCAGGTCTGT	TTCTCATTCC	CCTCCCTGCC
pDonor-2	TAAATAAATA	AAATGCCCT	CCAGGTCTGT	TTCTCATTCC	CCTCCCTGCC

WT-cow	TTTCCCCTTG	C'TTTCTTGCC	CAAAGGCCAG	CCAGTATTCT	CTGGTGGAAG
Trans-cow	TTTCCCCTTG	C'TTTCTTGCC	CAAAGGCCAG	CCAGTATTCT	CTGGTGGAAG
pDonor-1	TTTCCCCTTG	C'TTTCTTGCC	CAAAGGCCAG	CCAGTATTCT	CTGGTGGAAG
pDonor-2	TTTCCCCTTG	C'TTTCTTGCC	CAAAGGCCAG	CCAGTATTCT	CTGGTGGAAG

**Hind III**

WT-cow	AACAATCAGC	GGGAGGTAAA	GAAGATCGAG	GCAGTCTCCA	CCTCCCACCC
Trans-cow	AACAATCAGC	GGGAGGTAAA	GAAGATCGAG	GCAGTCTCCA	CCTCCCACCC
pDonor-1	AACAATCAGC	GGGA <b>AAGCTT</b>	-----	-----	-----
pDonor-2	AACAATCAGC	GGGAGGTAAA	<b>GCTT</b> -----	-----	-----

WT-cow	TGGCCGGACG	GGTCACAGGC	CTGCAGACCA	GGGAGAGGCG	CACCACTGCG
Trans-cow	TGGCCGGACG	GGTCACAGGC	CTGCAGACCA	GGGAGAGGCG	CACCACTGCG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CACGCGCAGG	CGAGGCCCT	GTTGGAGCCC	CCGCCCTTGC	TGCAGCCCCG
Trans-cow	CACGCGCAGG	CGAGGCCCT	GTTGGAGCCC	CCGCCCTTGC	TGCAGCCCCG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	GGACGCGGTG	CGGTACGTGG	CCAGTCACGC	AGCATGCCCA	GTCCGAGTGG
Trans-cow	GGACGCGGTG	CGGTACGTGG	CCAGTCACGC	AGCATGCCCA	GTCCGAGTGG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CCAGCCACAG	CCACCCTGCA	CCCCTCTGG	GCAAGGCCCA	GCTCTGGCGT
Trans-cow	CCAGCCACAG	CCACCCTGCA	CCCCTCTGG	GCAAGGCCCA	GCTCTGGCGT
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	GTCTGTTGCA	CGTCTGTCCC	CTCCCACAGC	TCTGCGATGT	AGCAAAGCGA
Trans-cow	GTCTGTTGCA	CGTCTGTCCC	CTCCCACAGC	TCTGCGATGT	AGCAAAGCGA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	GGTGGCCAAG	GCCAAGGCCA	AGGCCAAGGC	CACCAACACA	CAAGCAGCTC
Trans-cow	GGTGGCCAAG	GCCAAGGCCA	AGGCCAAGGC	CACCAACACA	CAAGCAGCTC
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	AGCTGTGTCC	CCGGGAATGG	AGGTTGCAGG	GCTGGACACA	TAACTTCCCT
Trans-cow	AGCTGTGTCC	CCGGGAATGG	AGGTTGCAGG	GCTGGACACA	TAACTTCCCT
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	CCCCCTCCCG	CCGTCCCCTG	TCCTACGTAT	CCAAGAATCA	GGATGGCCCA
Trans-cow	CCCCCTCCCG	CCGTCCCCTG	TCCTACGTAT	CCAAGAATCA	GGATGGCCCA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

**3' Junction primer-R**

WT-cow	GCCTGGGCCC	TGCCCTCCAG	GGTCTCGCA	CCCGCAG <sup>AGA</sup>	GGGAGCAATG
Trans-cow	GCCTGGGCCC	TGCCCTCCAG	GGTCTCGCA	CCCGCAG <sup>AGA</sup>	GGGAGCAATG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	<b>CGGG</b> GCCCAC	AGGAGGCCCC	GGAGGCAGCT	GACCGAGGGA	CAGATGAGGG
Trans-cow	<b>CGGG</b> GCCCAC	AGGAGGCCCC	GGAGGCAGCT	GACCGAGGGA	CAGATGAGGG
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	ACAAGGCCGT	CAGTCCCGCA	GGGCTGGGTC	CAGCCAGACC	CGGGCTGCCA
Trans-cow	ACAAGGCCGT	CAGTCCCGCA	GGGCTGGGTC	CAGCCAGACC	CGGGCTGCCA
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

WT-cow	GGCTGGCGTG	TGCGTGCACC	TTAAGGGGCA	GGCACCCTGT	GGCCACGGT
Trans-cow	GGCTGGCGTG	TGCGTGCACC	TTAAGGGGCA	GGCACCCTGT	GGCCACGGT
pDonor-1	-----	-----	-----	-----	-----
pDonor-2	-----	-----	-----	-----	-----

Query sequence for ZifiT

Bos Taurus chromosome 25 Btau\_4.6.1 Chr25. position 40,631,870- 40,632,430

AAGAACCTTGCCCTTGTCCAGGAATCCAGGGGGCTTCCTGGAAGAGGTGATATGTACACC  
AAACCCTAAAGGAGAAGCAGAACTTAAAGAAGCAGAAAGGATGCGTGTGGGGAGCAGAGTC  
CATTACAGACCGAGAGAACAGGAAGGGCAGAGGCCCTGAGGCAGATTTGGTGTCTAAGGA  
TTAGAAGGCAGAGTGTCTGGGAACACAGAGTAAGGCTGGAGGGGCAAGGGGTGAGGTTAG  
CCCACTCCCAAAGTAGCCGCGGTCTCCACAAGTATGTGCAGTGTGACGTGCAGCTCCTT  
GAATTGCCACTCACAGGTTCCAGCACCCAGATCGACGTACAGGCCTAGGGTTCCAGAAGC  
TTCCATCACACCCTTTCTAGTGGTCTCCACATAGGGCACCTTTGTCCTGTCTTCTGCACA  
TAGATTGGCTCCCTGTCTTTAAACTCCACGAAAACAGGATCAGAGAGAATCCGTTCTTGTG  
TGTGAAGTGGGAGCTCACTGTGGTTTGCATTTGCATTTACGGATGACCCGTGATGTCGAG  
TCTCTTCTTATC